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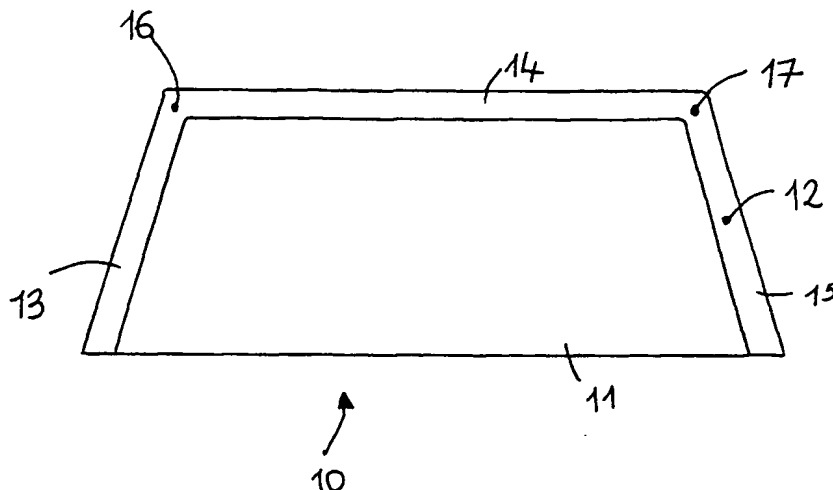
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(54) Title: GLAZING PANEL



(57) Abstract: A glazing panel is manufactured by fusing a pre-formed, thermoplastics completion section to a thermoplastics profile positioned at the periphery of the glazing panel to form a substantially continuous join, particularly to form sharp corners for an automotive glazing.

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Glazing panel

This invention relates to glazing panels and particularly, but not exclusively to glazing panels provided with profile strips which are adapted to be fitted into vehicles, particularly automotive vehicles.

The invention will be particularly described in relation to vehicle windscreens and rear screens. Nevertheless, it is equally applicable to other forms of glazing, for example vehicle side windows and sunroofs and to architectural glazing. The invention may be used in relation to laminated or monolithic glazings or in relation to composite glazings or plastics glazings.

Profile strips used, for example, to form a seal against the bodywork of a vehicle, may be provided at one or more edges of a glazing by injection moulding or by extrusion. Injection moulding allows great freedom in the shape of profile produced but requires significant tooling investment for each model of glazing. Extruded profile strips attached to the glazing panel using a robot require less tooling investment but present a number of difficulties; these include joining the two ends of an extruded profile together when a continuous peripheral profile is desired and forming sharp corners at the corner sections of the glazings without deforming the desired form of the profile.

Corner sections of a glazing panel having an extruded profile can be post-formed by injection moulding. However, this is disadvantageous in terms of cycle times, requires investment in injection moulding equipment, carries the risk of breaking the glazing due to the injection moulding process and generally requires manual finishing of the injection moulded portion to remove flash. Joining two ends of a profile strip by injection moulding has similar drawbacks.

According to one aspect, the present invention provides a method of manufacturing a glazing panel as defined in claim 1.

The thermoplastics material may be homogeneous or it may be a composite material. A PVC may be used. A thermoplastic elastomer (TPE) is particularly preferred, especially for portions formed by extrusion. Different materials and/or different compositions of similar materials may be used for the profile and the completion section. The fusion of the materials requires at least partial melting or softening at interfaces between the completion section and the profile so as to form a substantially continuous join.

The fusing of the pre-formed completion section to the profile is preferably carried out at the glazing panel subsequent to securing the profile to the glazing. The fusing

may be achieved by heating interfaces to be fused, for example, by direct contact or using a heating fluid, and subsequently contacting such interfaces together.

5 The clamping of the completion section and of the portion of the profile to which it is intended to be attached may be achieved manually. Preferably, the clamping is achieved in a press have a form that encourages the desired configuration of the profile; the press may have substantially the shape of the completion section and of the portion of the profile to which it is intended to be attached. The press may be heated; it may be provided with means for heating the interface between the completion section and the profile; additionally or alternatively, separate heating
10 means may be provided for this purpose. Contact or non-contact heating means may be used.

The additional, intermediary fusion portion may be of the same or of a different material or composition to the profile and completion section. The additional, intermediary fusion portion may be placed at an interstice between the profile and
15 completion section prior to the clamping. Alternatively, the additional, intermediary fusion portion may be positioned at an interface of the profile at the glazing prior to positioning and clamping of the completion section.

Preparation of the profile by cutting the profile to form an interface adapted to be attached to the completion section may be achieved using a cutting implement
20 comprising a blade or a wire. The cutting implement may be heated. A positioning jig may be used to facilitate accurate positioning of the portion of the profile to be cut. A jig may be used to facilitate marking of the portion of the profile for subsequent manual cutting.

The completion section may be formed by moulding, particularly injection
25 moulding or it may be formed by pressing, for example between parts of a heated mould.

According to further aspects, the present invention provides for use of a method as defined in claim 13 to form a sharp cornered profile for an automotive glazing panel and for an automotive glazing panel as defined in claim 14.

30 Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings of which:

- Fig 1 is a plan view of a glazing panel after a first manufacturing step;
- Fig 2 is a plan view of a glazing panel after a second manufacturing step;
- Fig 3 is a plan view of a completed glazing panel;
- 35 Fig 4 is an exploded perspective view of a corner portion of a glazing panel;
- Fig 5 is a schematic side view of a glazing panel;
- Fig 6 is a schematic side view of an alternative glazing panel.

Glazing panel 10 is an automotive rear screen having a thermoplastics profile 12 positioned at three of the peripheral edges of a four-sided glazing 11. As illustrated in Fig 1, the profile 12 is extruded from an extrusion nozzle and placed around the peripheral edges of the glazing 11 as a continuous strip. Fig 1 illustrates, greatly exaggerated for clarity, that corner sections 13, 14 of the extruded profile strip 12 form a radius connecting rectilinear portions of the profile strip. The minimum radius that may be achieved will depend upon the cross-section and configuration of the profile strip and the method used to form and position the profile strip 12.

Fig 2 shows corner sections of the profile strip 12 having been cut away and removed from the glazing 11 so as to leave three substantially rectilinear portions 13,14,15. If the glazing 11 is treated, for example with a primer, to facilitate adhesion of the profile strip 12 to the glazing, it may be desirable not to treat the portions of the glazing from which the profile strip 12 is intended to be removed, or to treat these portions in some other way

As illustrated in Fig 3, first 13 and second 14 rectilinear profile strips portions are subsequently joined together at the glazing 11 by fusion with a completion section 16 which forms one corner section. Second 14 and third 15 rectilinear portions are subsequently joined together by fusion with completion section 17 which forms another corner section. Adhesion of the completion sections 16,17 to the glazing 11 may be enhanced by use of a primer or by some other treatment. Corner sections 16,17 have sharper corners than that that could be achieved by positioning a single, continuous extrusion strip on the glazing.

Each corner of the glazing panel 10 may be processed separately and sequentially or each may be processed at the same time. Preferably, the processing involved in fusing the completion sections 16,17 to their respective portions of the profile is carried out just after the thermoplastics profile strip 12 has been extruded and positioned at the glazing 11 so that the profile strip is still above room temperature and thus requires less additional heating to cause its fusion.

Fig 4 shows first 41 and second 42 halves of a press used to process a corner section. Once a portion of the profile strip 12 has been removed to leave a free corner 43 at the glazing 11, pre-formed completion section 16 is placed in first press half 41, interfaces 44,45,46,47 of the profile strip 12 and corner section 16 are heated using hot air to cause them to at least partially melt or become tacky or fusionable. The first and second halves of the press are then closed around the glazing 11 so as to position and contact the completion corner section with the profile strip 12 and to cause the interfaces 44,45,46,47 to fuse together. Lip portions 48, 49 of the profile strip 12 and of the corner section 16 are also fused together at their

respective interfaces. Heated air is also used to heat the surface of the completion section that will contact the glazing 11 so as to facilitate secure adhesion to the glazing. The surface of the glazing may likewise be heated.

Fig 5 shows use of a separate fusion portion 51 used to fuse together interfaces 52,53 of a completion section 54 and a profile strip 55. The interfaces and the fusion portion 51 are heated prior to pressing the pieces together so as to cause fusion between the completion section 54 and the fusion section 51 and between the fusion section 51 and the profile strip 55. The fusion portion 51 may take the form of a strip or roll of material; it may be extruded, for example, extruded directly into position.

Fig 6 shows use of a fusion portion 61 to fuse interfaces 62, 63 of completion section 64 and profile strip 65 and, in addition to complete a space or gap initially left between the completion section 64 and profile strip 65. The same press may be used both to position the completion section 64 at the surface of the glazing 11 and to subsequently press and form the subsequently positioned intermediary fusion portion 61.

Use of direct fusion between the completion portion and the profile may substantially avoid the creation of flash and avoid the need for subsequent trimming. Nevertheless, the press may be adapted to remove any flash.

It is advantageous to ensure that the interface between the completion section and the profile which is positioned at the surface of the glazing is entirely fused; this creates a good looking join when viewed through the glazing, for example, from the exterior of a vehicle in which the glazing is secured.

Whilst the illustrated embodiments comprise removal of a portion of the profile to allow subsequent attachment of a completion section, it may be possible to fuse the completion section to a continuous profile, without removal of any part thereof, for example attaching the completion portion to form an attachment to and extension of the existing lip projecting beyond the edge of the glazing.

The sharp corner created by the present invention may facilitate close fitting of the glazing into a frame, for example, a frame provided as part of the bodywork of a vehicle. This may be particularly desirable when the glazing panel 10 is to be flush fitting with a surrounding frame in which it is assembled.

The profile may be deposited on a band, for example a band of black or opaque enamel, carried on a surface of the glazing rather than being deposited directly on to the glazing.

A similar method may be used to join two ends of a profile, for example, to form a continuous profile around the entire periphery of a glazing panel.

Claims

1. A method of manufacturing a glazing panel which comprises a profile secured at a portion of at least one edge of a glazing comprising the steps of:
 - a) securing a profile comprising a thermoplastics material at at least part of a peripheral edge of the glazing;
 - b) fusing a pre-formed completion section comprising a thermoplastics material to a portion of the profile to form a substantially continuous join between them.
2. A method in accordance with claim 1, comprising:
 - c) clamping together the completion section and the portion of the profile to which is to be attached.
3. A method in accordance with claim 1 or claim 2, in which the steps of (b) fusing a pre-formed completion section comprising a thermoplastics material to a portion of the profile and (c) clamping the completion section and the portion of the profile to which is to be attached to form a substantially continuous join between them are carried out together in a single step.
4. A method in accordance with any preceding claim, in which the material of the completion section and the material of the profile are fused directly to each other.
5. A method in accordance with any one of claim 1 to 3, in which the material of the completion section and the material of the profile are fused together via an additional, intermediary fusion portion comprising a thermoplastics material to which each is fused.
6. A method in accordance with any preceding claim, in which portions to be fused are pre-heated using a heated gas or vapour.
7. A method in accordance with any preceding claim, in which prior to the step of (b) fusing the pre-formed completion section comprising a thermoplastics material to the portion of the profile, the profile is prepared by cutting the profile subsequent to it being secured to the glazing to form an interface adapted to be attached to the completion section and removing any excess

part of the profile so as to leave the interface ready to receive the completion section.

- 5 8. A method in accordance with any preceding claim, in which at least part of the attachment between the completion section and the profile is chamfered.
9. A method in accordance with any preceding claim, in which the completion section forms a corner section of the glazing panel.
- 10 10. A method in accordance with any preceding claim, in which both the profile and the completion section comprise a lip adapted to project beyond the periphery of the glazing, and in which the said lips are fused together to produce a substantially continuous joint between them.
- 15 11. A method in accordance with any preceding claim, in which the profile is formed by extrusion.
12. A method in accordance with any preceding claim, in which the completion section is formed between a pair of shaped moulds.
- 20 13. Use of a method in accordance with any preceding claim to form a sharp corner in a profile of an automotive glazing panel.
14. An automotive glazing panel produced by a method in accordance with any preceding claim.
- 25 15. A glazing panel comprising a thermoplastics profile secured to at least part of a peripheral edge of the glazing panel and a separately formed thermoplastics completion section fused to the profile to form a substantially continuous join between them.
- 30 16. A glazing panel in accordance with claim 15, in which the profile and the completion section are fused directly to each other.
- 35 17. A glazing panel in accordance with claim 15, in which the profile and the completion section are fused together via an additional, intermediary fusion

portion comprising a thermoplastics material to which each is fused.

18. A glazing panel in accordance with any one of claims 15 to 17, in which the completion section forms a corner section of the glazing panel.
- 5 19. A glazing panel in accordance with any one of claims 15 to 18, in which both the profile and the completion section comprise a lip adapted to project beyond the periphery of the glazing, and in which the said lips are fused together to produce a substantially continuous joint between them.
- 10 20. A glazing panel in accordance with any one of claims 15 to 19, in which the glazing panel is an automotive glazing panel.

FIG 1

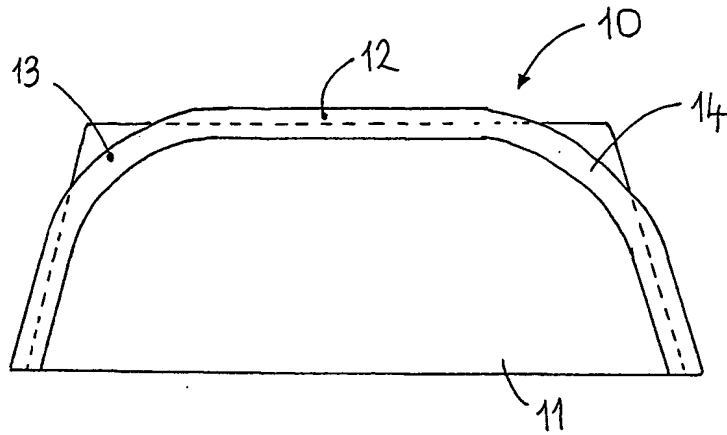


FIG 2

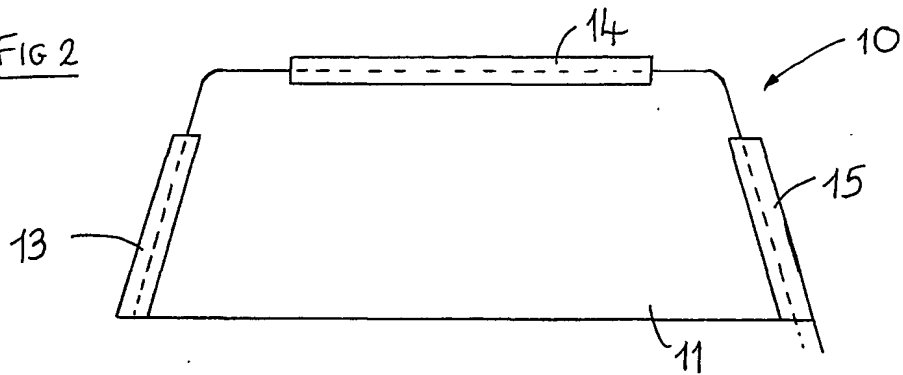


FIG 3

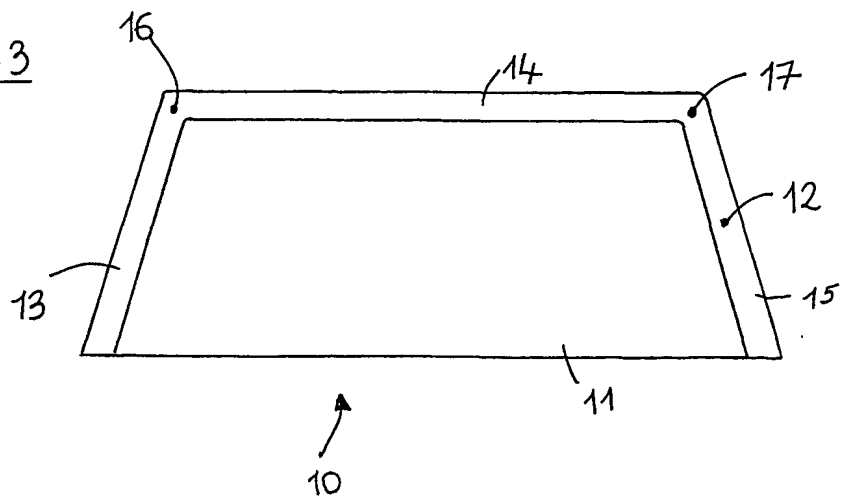
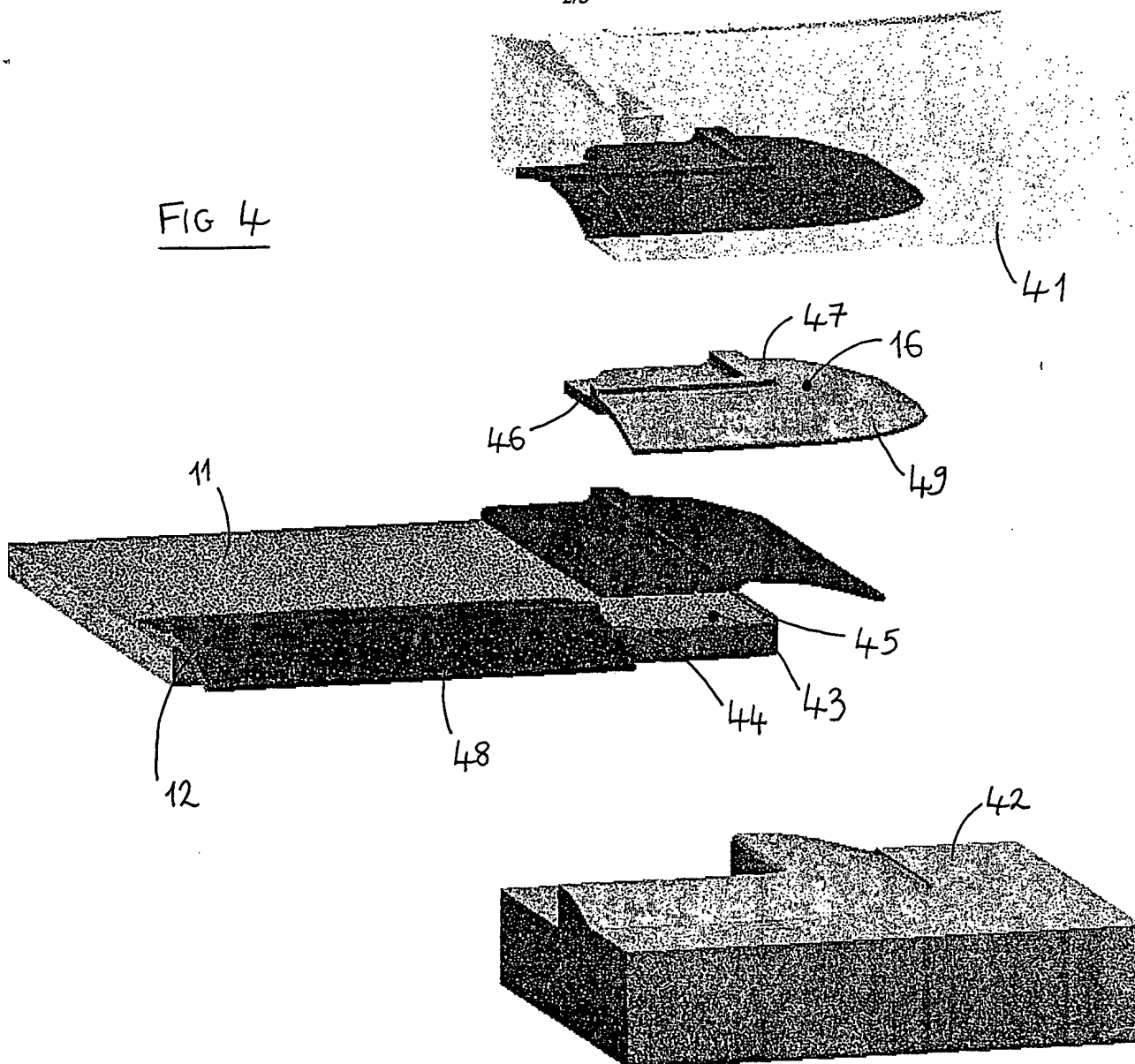


FIG 4



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FIG 5

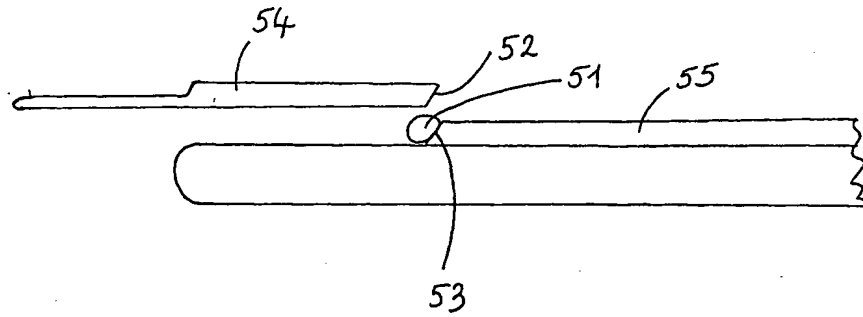


FIG 6

